In Re Application of Kelvin S. Vartti et. al.
Title: Programmable System & Method for Accessing a Shared Memory
File #5487 – Customer # 27516
Attorney: Beth L. McMahon, Reg. 41, 987, 651-635-7893
1 of 6 Drawings

FIG. 1

In Re Application of Kelvin S. Vartti et. al.
Title: Programmable System & Method for Accessing a Shared Memory
File #5487 – Customer # 27516
Attorney: Beth L. McMahon, Reg. 41, 987, 651-635-7893
2 of 6 Drawings

Figure 2

REQUEST FOR DATA IS RECEIVED FROM MAIN MEMORY — 300

IS THE REFERENCE INDICATOR SET TO "CACHE NOT PRESENT" MODE ? — 302

YES

ISSUE REQUEST TO ONE OR MORE OTHER MEMORIES — 304

NO

IS THE REFERENCE INDICATOR SET TO "SHARED CACHE" MODE ? — 310

YES

ISSUE REQUEST TO ONE OR MORE OTHER MEMORIES — 330

UPDATE CACHE TAGS — 332

RETRIEVE CACHE DATA — 334

IF ANY UPDATED DATA IS RECEIVED FROM OTHER MEMORIES, RETURN UPDATED DATA TO MAIN MEMORY — 306

IF ANY UPDATED DATA IS RECEIVED FROM OTHER MEMORIES, RETURN UPDATED DATA TO MAIN MEMORY, OTHERWISE RETURN DATA RETRIEVED FROM CACHE TO MAIN MEMORY. DATA IS RETURNED AFTER ALL COHERENCY OPERATIONS ARE COMPLETED — 336

DONE

Figure 3A
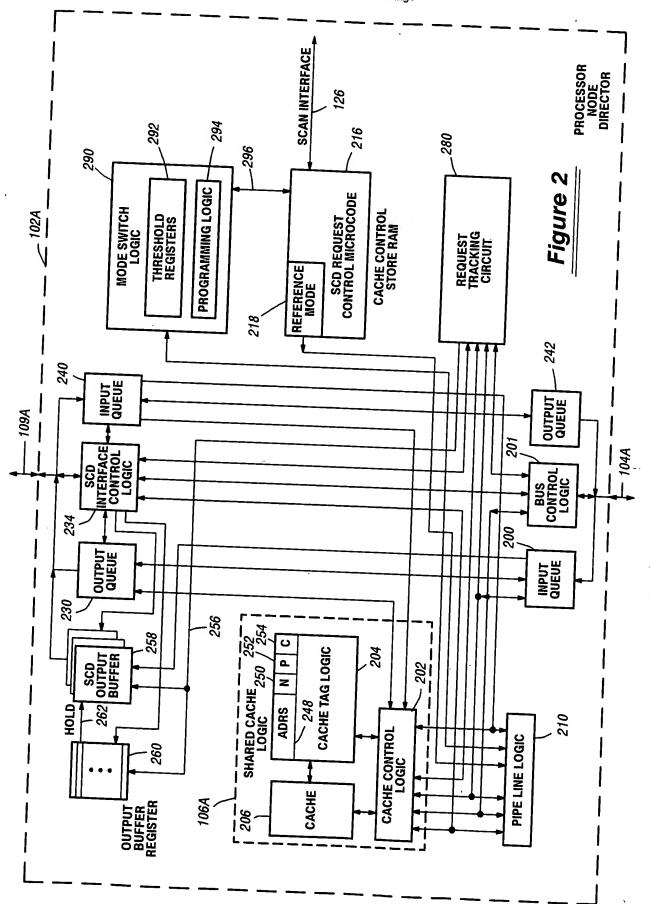
Fig. 3A

Fig. 3B

Figure 3

312

In Re Application of Kelvin S. Vartti et. al.
Title: Programmable System & Method for Accessing a Shared Memory
File #5487 – Customer # 27516
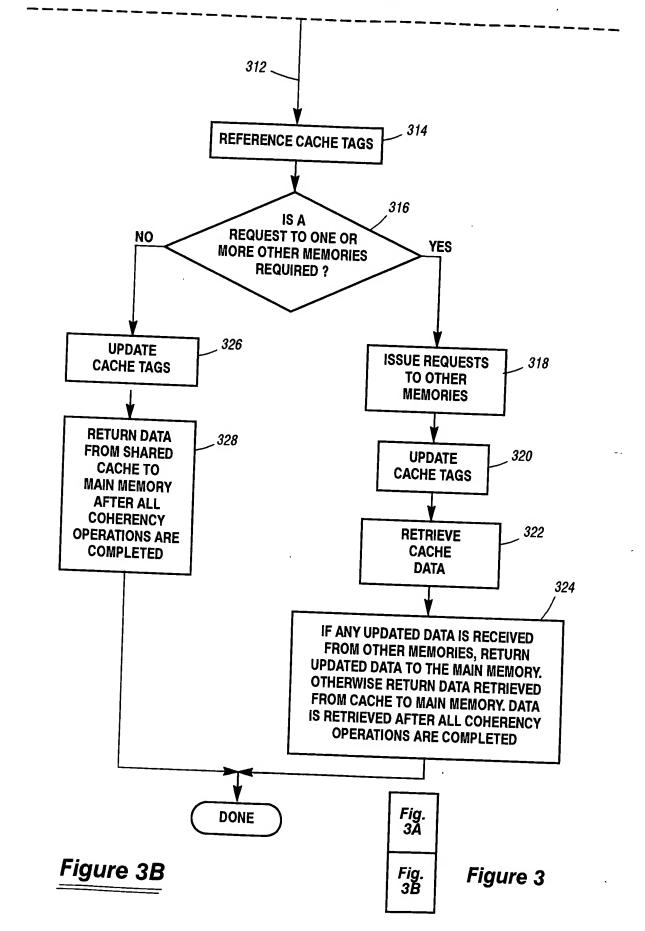Attorney: Beth L. McMahon, Reg. 41, 987, 651-635-7893
4 of 6 Drawings

312

REFERENCE CACHE TAGS — *314*

IS A REQUEST TO ONE OR MORE OTHER MEMORIES REQUIRED ? *316*

NO   YES

UPDATE CACHE TAGS — *326*

ISSUE REQUESTS TO OTHER MEMORIES — *318*

RETURN DATA FROM SHARED CACHE TO MAIN MEMORY AFTER ALL COHERENCY OPERATIONS ARE COMPLETED — *328*

UPDATE CACHE TAGS — *320*

RETRIEVE CACHE DATA — *322*

324

IF ANY UPDATED DATA IS RECEIVED FROM OTHER MEMORIES, RETURN UPDATED DATA TO THE MAIN MEMORY. OTHERWISE RETURN DATA RETRIEVED FROM CACHE TO MAIN MEMORY. DATA IS RETRIEVED AFTER ALL COHERENCY OPERATIONS ARE COMPLETED

DONE

Figure 3B

Fig. 3A

Fig. 3B

Figure 3

In Re Application of Kelvin S. Vartti et. al.
Title: Programmable System & Method for Accessing a Shared
Memory
File #5487 – Customer # 27516
Attorney: Beth L. McMahon, Reg. 41, 987, 651-635-7893
5 of 6 Drawings

```
                    ┌──────────────────────┐
                    │  SET REFERENCE MODE TO │──── 400
                    │    A DEFAULT VALUE     │
                    └──────────────────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │   ENABLE AUTOMATED    │──── 402
                    │     MODE SWITCH       │
                    └──────────────────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │   INITIALIZE COUNT    │──── 404
                    │    VALUES TO ZERO     │
                    └──────────────────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │   RECEIVE REQUEST FOR │──── 406
                    │ DATA FROM MAIN MEMORY │
                    └──────────────────────┘
```

IF A REQUEST TO A MEMORY OTHER THAN THE CURRENT CACHE IS REQUIRED TO FULFILL THE REQUEST, INCREMENT A MISS COUNT, OTHERWISE INCREMENT A HIT COUNT —— 408

IF MISS COUNT EXCEEDS A FIRST PREDETERMINED THRESHOLD VALUE AND THE REFERENCE MODE IS SET TO CACHE MODE, SET REFERENCE MODE TO AN ALTERNATIVE MODE —— 410

IF HIT COUNT EXCEEDS A SECOND PREDETERMINED THRESHOLD VALUE AND THE REFERENCE MODE IS SET TO THE ALTERNATIVE MODE, SET REFERENCE MODE TO CACHE MODE —— 412

414

DOES SUM OF FIRST AND SECOND COUNT VALUES EQUAL A PREDETERMINED TOTAL REQUEST VALUE ?

YES   NO

Figure 4

In Re Application of Kelvin S. Vartti et. al.
Title: Programmable System & Method for Accessing a Shared Memory
File #5487 – Customer # 27516
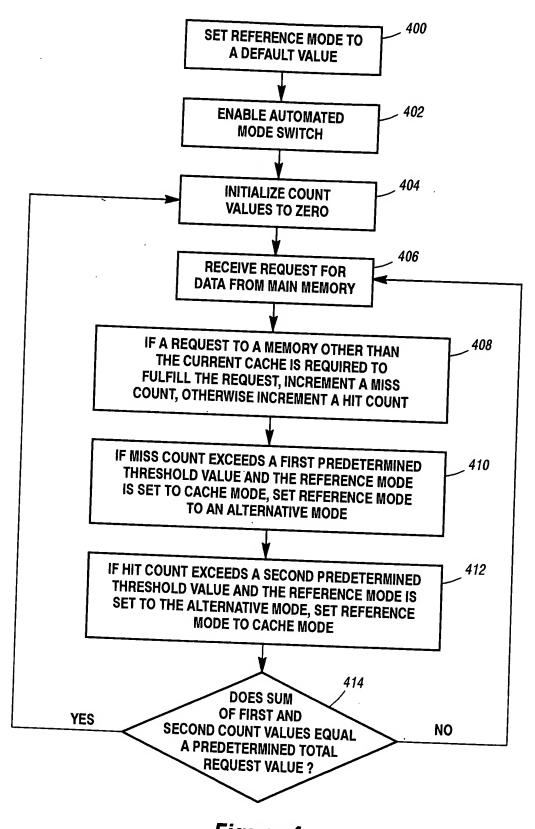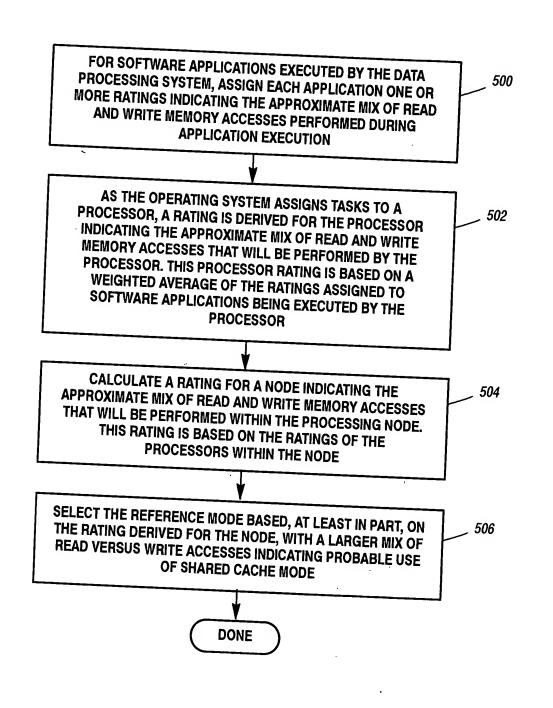Attorney: Beth L. McMahon, Reg. 41, 987, 651-635-7893
6 of 6 Drawings

FOR SOFTWARE APPLICATIONS EXECUTED BY THE DATA PROCESSING SYSTEM, ASSIGN EACH APPLICATION ONE OR MORE RATINGS INDICATING THE APPROXIMATE MIX OF READ AND WRITE MEMORY ACCESSES PERFORMED DURING APPLICATION EXECUTION — 500

AS THE OPERATING SYSTEM ASSIGNS TASKS TO A PROCESSOR, A RATING IS DERIVED FOR THE PROCESSOR INDICATING THE APPROXIMATE MIX OF READ AND WRITE MEMORY ACCESSES THAT WILL BE PERFORMED BY THE PROCESSOR. THIS PROCESSOR RATING IS BASED ON A WEIGHTED AVERAGE OF THE RATINGS ASSIGNED TO SOFTWARE APPLICATIONS BEING EXECUTED BY THE PROCESSOR — 502

CALCULATE A RATING FOR A NODE INDICATING THE APPROXIMATE MIX OF READ AND WRITE MEMORY ACCESSES THAT WILL BE PERFORMED WITHIN THE PROCESSING NODE. THIS RATING IS BASED ON THE RATINGS OF THE PROCESSORS WITHIN THE NODE — 504

SELECT THE REFERENCE MODE BASED, AT LEAST IN PART, ON THE RATING DERIVED FOR THE NODE, WITH A LARGER MIX OF READ VERSUS WRITE ACCESSES INDICATING PROBABLE USE OF SHARED CACHE MODE — 506

DONE

Figure 5